

# **SPECIFICATION**

## **TITLE**

### **METHOD AND APPARATUS FOR TRANSMITTING VOICE INFORMATION IN A MOBILE RADIO NETWORK**

#### **BACKGROUND OF THE INVENTION**

##### **Field of the Invention**

The present invention relates to a method and an apparatus for transmitting voice information representing language through the core network of a mobile radio network, between connected core networks of mobile radio networks, and from mobile radio networks to wire-bound users of a PSTN.

##### **Description of the Prior Art**

As it is known from different manual textbooks such as Jacek Biala, 1994, ISBN-3-528-15302-4, Vieweg Verlag, mobile radio communication occurs between two mobile stations in a mobile radio network from a mobile station (User Equipment UE) via an air interface (Air Interface/Radiolink) to a base station (or, respectively, a Radio Network Controller RNC) via switching centers (Mobile Switching Centers MSCs or Media Gateways MGW) and via a further base station to a second mobile station (UE). Since a number of users normally telephone in a mobile radio network, considerable amounts of data are transmitted via the core network of a mobile radio network; particularly, between switching centers (media gateways).

It is proposed in WO93/00778A1 to transmit voice data in the core network of a mobile radio network in a compressed format and not in a 64kb/s-FCM format.

As a compressed format, WO93/00778A1 suggests the voice data compression format used between mobile stations and base stations/radionet controller (e.g., according to UMTS) for optimally utilizing the extremely limited channel capacities on an air interface; voice data therefore being transmitted in the format(for example, according to UMTS standard) in which they are transmitted via an air interface also within the core network of the mobile radio network. For this purpose, known (under UMTS, etc.) transcoders (which, in a base station or MSC etc., previously have converted voice data from the compressed air interface format

into a non-compressed 64kb/s-PCM format for the transmission in the core network of a mobile radio network) are switched off or, respectively, are bypassed (Transcoder-Free-Operation = TrfO = Uncoded Operation.

5 However, it is difficult to implement this transmission method since the transmission of voice data in a mobile radio network in the TrfO data format in the core network does not allow many features such as mixing voice data of a number of callers given a conference call or importing tones or announcements into transmitted voice data.

10 An object of the present invention, therefore, is to enable an optimized use of transmission resources, when bits of voice information are transmitted in a mobile radio network, by avoiding the above disadvantages.

### **SUMMARY OF THE INVENTION**

Accordingly, dependent on parameters/results (such as an intended playing of tones or announcements or intended conference circuits), the inventive  
15 TranscoderFreeOperationBreakEquipment (TBE = device for interrupting a transcoder-free transmission by transcoding) is or is not switched through a telecommunication network into the transmission path of voice data . When the TBE is switched into the TrFO transmission path of voice data through a telecommunication network, the data are transcribed, further processed (mixed with  
20 announcements or bits of voice information of another call partner of a conference duplicated for tapping measures, etc.) and are compressed again into a TrFO format prior to a transmission to another media gateway or a switch.

This makes it possible to optimally use the transmission resources in a mobile radio network and still allow for the execution of functions that are not  
25 possible with respect to the transcribed transmission from the mobile radio terminal device through the mobile radio network (= without transforming into a non-transcribed format in a transcoder) such as playing tones or mixing a quantity of voice information given a conference circuit.

Additional features and advantages of the present invention are described in,  
30 and will be apparent from, the Detailed Description of the Preferred Embodiments and the Drawings.

## **DESCRIPTION OF THE DRAWINGS**

Figure 1 schematically shows the transmission from a mobile radio terminal device through a mobile radio network to a further mobile radio terminal device; and

5        Figure 2 shows the transmission from a mobile radio terminal device to another mobile radio terminal device through a mobile radio network.

## **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Figure 1 shows a mobile radio terminal device ( $UE_{\text{ORIG}}$ ) 1 from which bits of voice information are transmitted via a base station and base station control  
10        ( $RNC_{\text{ORIG}}$  in UMTS) 2, a voice information transmitting device 3 (Switch/ $MGW_{\text{ORIG}}$ ), a further voice information transmitting device (Switch/ $MGW_{\text{Term}}$ ) 4 USW, a further base station/base station control device ( $RNC_{\text{Term}}$ ) 5 and a further air interface 6 to a mobile radio terminal device 7 ( $UE_{\text{Term}}$ ) receiving the voice information. Given a traditional voice transmission,  
15        bits of voice information are transmitted from the mobile radio terminal device 1 via the air interface 7 to the RNC 2 and from the RNC 5 via the air interface 6 to the receiving mobile radio terminal device 8 ( $UE_{\text{Term}}$ ) in a compressed (= non-transcoded) format. Traditionally, a transcoder converts these compressed voice data (for example 16kb/s) into a non-compressed format (= transcoded, e.g. 64kb/s-  
20        PCM) for the transmission via the line switches or packet switching centers 3, 4 (or fixed network switches or packet switching centers). Given a Transcoder-Free-Operation, the compressed bits of voice information (that are already transmitted via the air interface 7 with 16kb/s-format, for example) are transmitted in this compressed format up to the receiving mobile station 8 (or alternatively up to a  
25        transition into a fixed network) instead of the converted data with 64kb/s-format. Given this transmission of voice information without transcodings in a transcoder (in 2 or 3) into a non-compressed format, it is problematic to mix-in bits of voice information of a number of mobile stations (1, 8 USW) for a conference circuit or to mix tones or announcements into bits of voice information. Therefore, it is  
30        inventively proposed to provide a feeding device 9 as shown in Figure 2 (Trf0 Break Equipment = Trf0 interruption device 9), wherein the feeding device 9,

dependent on the event (an event is a planned conference, playing of  
announcements, interception, etc., for example), converts bits of voice information  
in the mobile radio network into a transcoded format, further processes them (e.g.,  
mixing voice data of the conference partners for a planned conference, mixing these  
5 announcements with bits of voice information for playing announcements,  
duplicating the voice data for an interception, etc.), converts them into a non-  
transcoded format and has them further transmitted (10) in a non-transcoded  
format.

The conversion device for converting bits of voice information into a  
10 transcoded format and/or for (back-) converting (subsequent to the further  
processing) into a non-transcoded format can be a traditional transcoder in the  
media gateway or switch or can be situated somewhere else and can be driven by it  
or, respectively, by an inventive device situated there (TranscoderBreakFunction).

Although the present invention has been described with reference to specific  
15 embodiments, those of skill in the art will recognize that changes may be made  
thereto without departing from the spirit and scope of the invention as set forth in  
the hereafter appended claims.